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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,987	08/27/2003	Akira Matsunami	032350.B518 (TI-34895)	4393
23494	7590	02/22/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			NOVACEK, CHRISTY L	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/648,987

Applicant(s)

MATSUNAMI, AKIRA

Examiner

Christy L. Novacek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-18 is/are allowed.
- 6) ☒ Claim(s) 1-15, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

This office action is in response to the communication filed August 27, 2003.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7, 8, 14, 15, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 7, 8, 14, 15, 19 and 20 recite the limitation "the integrated circuit packages" in line 1 of each claim. There is insufficient antecedent basis for this limitation in the claim.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-6, 9, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Gochnour et al. (US 6,224,936).

Regarding claim 1, Gochnour discloses disposing an integrated circuit chip (46) outwardly from a first surface of a substrate (36), positioning the integrated circuit chip and the substrate between a first mold press die (32) and a second mold press die (34), engaging the first mold press die with the second mold press die such that the integrated circuit chip is disposed

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within a cavity formed by the engagement of the first mold press die with the second mold press die, the cavity comprising a pre-warped configuration, encapsulating the integrated circuit chip with a mold compound such that the mold compound takes on the pre-warped configuration of the cavity, removing the encapsulated integrated circuit chip from the cavity, and curing the mold compound, whereby the curing transforms the mold compound from the pre-warped configuration to a predefined configuration (Fig. 2, 4, 6; col. 3, ln. 54-56; col. 4, ln. 34 – col. 5, ln. 41).

Regarding claim 4, Gochnour discloses that the pre-warped configuration is defined by a first non-planar surface on the first mold press die and a second non-planar surface on the second mold press die (col. 5, ln. 34-41).

Regarding claims 5 and 12, Gochnour discloses that the first and second mold press dies may have either a convex or concave surface (col. 5, ln. 34-41).

Regarding claims 6 and 13, Gochnour discloses that the predefined configuration substantially resembles a rectangular parallelepiped (Fig. 2, 6).

Regarding claim 9, Gochnour discloses an integrated circuit chip (46) disposed outwardly from a first surface of a substrate (36), a first mold press die (32) comprising a first non-planar surface, a second mold press die (34) comprising a second non-planar surface, the first and second non-planar surfaces forming upper and lower surfaces of a cavity when the first and second mold press die are engaged, the cavity having a pre-warped configuration, and a mold compound adapted to fill the cavity and encapsulate the integrated circuit chip, the mold compound adapted to transform from the pre-warped configuration to a predefined configuration after curing of the mold compound (Fig. 2, 4, 6; col. 3, ln. 54-56; col. 4, ln. 34 – col. 5, ln. 41).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 7, 8, 10, 11, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gochnour et al. (US 6,224,936) in view of the admitted prior art.

Regarding claims 2, 3, 7, 8, 10, 11, 14 and 15, Gochnour does not limit his invention to any particular type of integrated circuit package. Gochnour discloses semiconductor devices connected to a substrate via solder balls and semiconductor die bonded to a lead frame as examples of an integrated circuit that can be encapsulated, but does not specifically disclose forming ball grid array packages or quad flat packages (col. 2, ln. 6-7). Applicant's specification discloses that packaging/encapsulating of integrated circuits such as ball grid array packages and quad flat packages are conventional in the art (pg. 2, ln. 2-6). Applicant's specification discloses that ball grid array packages have solder balls attached to a second surface thereof, while quad flat packages have a leadframe around the periphery of the chip. At the time of the invention, it would have been obvious to one of ordinary skill in the art to apply the invention of Gochnour to ball grid array packages or quad flat packages (with their inherent solder ball and leadframe arrangements) because Gochnour does not limit his invention to any particular kind of integrated circuit package and because the admitted prior art states that it is conventional to encapsulate these types of packages.

***Allowable Subject Matter***

Claims 16-18 are allowed.

The following is an examiner's statement of reasons for allowance:

The primary reasons for the allowance of claims 16-18 is the inclusion therein, in combination as currently claimed, of the limitations of determining a pre-warped configuration for the cavity based on an anticipated warpage of the mold compound when removed from the cavity and further based on a predefined configuration of the mold compound after curing. These limitations were found in claims 16-18 and are neither disclosed nor taught by the prior art of record, alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Jeon et al. (US 6,432,750) disclose a method of preventing an integrated circuit package from warping by attaching the package to a pre-warped heat sink that compensates for the package warp.

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Katoh et al. (US 2001/0045643) disclose a method of preventing an integrated circuit package from warping by attaching the package to a pre-warped heat sink that compensates for the package warp.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN  
February 17, 2005

  
AMIR ZARABIAN  
PATENT EXAMINER  
TECHNOLOGY CENTER